REMARKS

Reconsideration of this application is respectfully requested.

Prior to entering the amendments above, the status of the claims is as follows. Claims 569-717, 719-869, 871-1021, 1023-1173, 1175-1294, 1296-1407, 1409-1568, 1570-1612 and 1614-1727 were previously pending in this application. Of these, claims 569-1297, 1411-1581 and 1700-1738 are allowable. Claims 1298-1304, 1306, 1320, 1323-1333, 1338-1340, 1345-1355, 1358, 1359, 1373, 1383, 1388-1392, 1394, 1396, 1398-1400, 1403, 1406, 1407, 1582, 1583, 1585, 1593, 1596-1599, 1601, 1602, 1604-1619, 1621-1637,1639, 1641, 1644-1651, 1653, 1656, 1682, 1686-1688, 1692 and 1694-1699 have been rejected. Some claims stand objected: claims 1305, 1307-1319, 1321, 1322, 1334-1337, 1341-1344, 1356, 1357, 1360-1372, 1374-1382, 1384-1387, 1393, 1395, 1397, 1401, 1402, 1404, 1405, 1408-1410, 1584, 1586-1592, 1594, 1595, 1599, 1600, 1603, 1620, 1638, 1640, 1642, 1643, 1652, 1654, 1655, 1657-1681, 1683-1685, 1689-1691 and 1693.

By the amendments above, claims 583, 642, 648, 670, 678, 684, 706, 711-712, 723, 735, 794, 800, 822, 830, 836, 858, 863-864, 876, 887, 946, 952, 974, 982, 988, 1010, 1015-1016, 1027, 1039, 1043, 1056-1057, 1098, 1104, 1126, 1134, 1140, 1162-1163, 1167-1168, 1179, 1249, 1255, 1270, 1288-1289, 1304, 1358, 1386, 1398, 1401-1402, 1417, 1430, 1454, 1516, 1545, 1559, 1562-1563, 1593, 1599, 1656, 1677, 1716, 1718 and 1728-1732 have been amended. Claims 596, 644, 647, 652-653, 680, 683, 688-689, 715, 748, 798-799, 804, 832, 835, 840-841, 867, 900, 948, 951, 956-957, 984, 987, 992-993, 1019, 1052, 1100, 1103, 1108-1109, 1136, 1139, 1144-1145, 1171, 1251, 1254 and 1259 have been canceled. New claims 1739-1748 have

been added above. Accordingly, claims 569-595, 597-643, 645-646, 648-651, 654-679, 681-682, 684-687, 690-714, 716-717, 719-747, 749-797, 800-803, 805-831, 833-834, 836-839, 842-866, 868-869, 871-899, 901-947, 949-950, 952-955, 958-983, 985-986, 988-991, 994-1018, 1020-1021, 1023-1051, 1053-1099, 1101-1102, 1104-1107, 1110-1135, 1137-1138, 1140-1143, 1146-1173, 1175-1250, 1252-1253, 1255-1258, 1260-1294, 1296-1407, 1409-1568, 1570-1612 and 1614-1748 are being presented for further prosecution on the merits.

Applicants appreciate the indication in the October 9, 2001 Office Action (page 2) that rejections and/or objections not reiterated from previous office actions have been withdrawn and that the two rejections in the latest Action constitute the complete set presently being applied against the present application.

I. Summary of Claim Amendments

In a sincere effort to define and clarify their claimed invention more clearly, Applicants have amended the claims above as follows.[1] Among the clarifying amendments are those to dependent sequencing claims 583, 735, 887 and 1039, which depend from independent claims 569, 712, 873 and 1025, respectively. As amended above, claims 583, 735 and 887 recite "wherein in said providing or generating step the fragments are provided or generated by one or more primers,

[1] None of the above amendments involve changes to independent claims. Applicants and their attorney are mindful of and appreciate that several claims have been deemed allowable. To the extent that any allowed dependent claims have been amended, Applicants believe that such amendments serve to clarify and further define their claimed subject matter. To the extent that any new dependent claims have been added, Applicants believe that such added claims also clarify their claimed subject matter by providing dependent embodiments for elements recited in the independent claims, particularly "nucleotide analog." In any case, Applicants and their attorney have paid strict attention to their disclosure and the requirements for adequate written description under 35 U.S.C. §112, first paragraph.

nucleoside triphosphates or analogs thereof, and a combination thereof." In the case of claim 1039 that depends from claim 1025, this claim recites "wherein prior to said detecting step the fragments are provided or generated by one or more primers, nucleoside triphosphates or analogs thereof, and a combination thereof." The impetus for amending these claims came from dependent claim 1039 which previously referred to a "providing or generating step" in claim 1025. Only a single "detecting" step is recited, however, in claim 1025. In amending claim 1039 to provide a proper antecedent basis, it also became apparent that the language in other similar dependent claims, 583, 735 and 887, should adopt similar amendments as claim 1039.

Other dependent sequencing claims have also been amended. In claims 642, 678, 794, 830, 946, 982, 1098, 1134, and 1249, the term "enzyme" has been deleted from the Markush groups and "chromogenic component" has been added. Support for the term "chromogenic component" is found in the specification, page 82, line 13 ("catalyze a *chromogenic* or fluorogenic reaction"). The term "chromogenic component" has also been added to dependent claims 670, 706, 822, 858, 974, 1010, 1126, 1162, 1270, 1358, 1386, 1398, 1454, 1516, 1545, 1559, 1656, 1677 and 1716 with respect to various elements ("indicator molecule," "Sig," "the moiety which can be detected when the complex is formed," "signaling component or indicator molecule," "one or more detectable oligonucleotides or polynucleotides"). Other aspects of "chromogenic" have been added to other claims. "Chromogenic measurement" has been added as one of the changes to claim 1163. As amended, claim 1163 recites "wherein said detectable labeled nucleic acid fragments are detectable non-radioactively by a fluorescent measurement, a chromogenic measurement, a chemiluminescent measurement, or a combination thereof. In claim 1718, the Markush member "phosphorescent

measurement" was changed to -- chromogenic measurement -- . Further, in claims 1728-1731, "chromogenic" was added to further define the detectable signal provided by the chelating compounds or chelating components. In a similar fashion, "chromogenic" was added to claim 1732 to further define the "detecting step" of various independent process claims carried out with chelating compounds or chelating components. Finally, with respect to claims 1728-1732, "chemiluminescent" has been added. Support for "chemiluminescent" appears in the specification, page 97, lines 17-20.

In other dependent claims (648, 684, 800, 836, 952, 988, 1104, 1140 and 1255) where Sig or A comprises a sugar residue, that sugar residue language has been amended above to recite that it is "capable of complexing with a sugar binding protein or a polysaccharide binding protein." Previously, those claims recited that the sugar residue is "complexed with or attached to a sugar binding protein or a polysaccharide binding protein."

A number of dependent sequencing claims have been amended by changing the word "fluoresceinated" to -- fluorescent -- . This adjective is applied in several claims to "fluorescent nucleotides or nucleotide analogs" and "fluorescent DNA." The affected claims include claims 711-712, 863-864, 1015-1016, 1167-1168, 1288-1289, 1401-1402 and 1562-1563.

Several of the dependent sequencing claims directed to Markush members for "organism" have been amended to clarify the subject matter being claimed or to correct language lacking an antecedent basis. For example, claim 723 has been changed to depend from claims 722 or 726. Previously, it depended only from claim 722. By making claim 723 multiply dependent, the Markush members for "organism" in claim 723 now properly depend from claims 722 and 726 which recite "organism" and "living organism," respectively. The same rationale applies

to claims 1027, 1179, 1304 and 1417 that have been amended in a way similar to the amendments as claim 723. Claim 876 has also been amended. It now depends from claim 875 (having a listing of organisms, including a mammal) and claim 878 ("said organism is living"). Previously, claim 876 only depended from claim 875. The foregoing changes to claims 723, 876, 1027, 1179, 1304 and 1417 were made after addressing the rejection of claim 1593 for indefiniteness under 35 U.S.C. §112, second paragraph. Claim 1593 itself has been amended above by changing its dependency from claim 1592 (human practice) to claims 1583 or 1584. Claim 1583 refers to the oligo- or polynucleotide of interest being "derived from an organism." In turn, claim 1584 recites "wherein said organism is living." The word "living" has also been deleted from claim 1593.

Another antecedent problem has been addressed by the amendments to claim 1043, which depends from claim 1025. Claim 1043 now recites "wherein prior to said detecting step, the one or more non-radioactive modified or labeled nucleotides or nucleotide analogs have been incorporated into said nucleic acid fragment or fragments." Previously, claim 1043 recited "wherein said providing or generating step, . . ." Since claim 1025 recites but a single detecting step, the new language in claim 1043 now has proper antecedent basis. Similarly, claims 1056 and 1057, which depend from claim 1025, have been amended to recite "wherein in said detecting step, . . .".

A minor informality has been corrected in claim 1163. The word "detectable" had been inadvertently underlined in Applicants' previous consolidation amendment filed on July 13, 2001. The amendment to claim 1163 removes this underlining. Another informality involving claim 1599 (mispelling of "nucleotide"), which was brought to light by the Examiner in the October 9, 2001 Office Action, has also been corrected above. The "means" phrase in claim 1599

has also been deleted so that the claim now recites "wherein said nucleotide analog can be attached terminally to DNA or RNA by an enzyme."

Claim 1430 has been amended for purposes of clarity. Previously, this claim recited "wherein said oligo- or polynucleotide (i) comprises at least one protein binding nucleic acid sequence selected from the group consisting of an antibody, a promoter, a repressor and an inducer." In light of the subject matter recited in independent claim 1411, dependent claim 1430 now recites "wherein said non-radioactive detectable protein is selected from the group consisting of an antibody, a promoter, a repressor and an inducer."

As required under the new Simplified Amendment Practice. Replacement paragraphs/sections/claims to be used. 37 CFR 1.121, as set forth in the Changes to the Patent Rules (37 CFR 1.121 MPEP Bookmark, Volume 1, Issue 3), a marked-up version of the claims amended above is attached as Exhibit A. This marked-up version is entitled "Version With Markings To Show Changes Made."

II. Summary of New Claims

Claims 1739-1748 have been added. Claim 1739 recites "wherein said fluorescent aromatic or cycloaliphatic group comprises a fluorescent dye." Support for "fluorescent dye" is found variously in the specification. See Example 9, pages 46-47. See in particular, page 47, line 11 ("fluorescent dye"). Claims 1740-1742 are directed to embodiments of the indicator molecules recited in other dependent claims (for example, claims 1577 and 1578). In further detail, claim 1740 recites "wherein said non-radioactively modified or labeled nucleotides or nucleotide analogs are labeled with the same indicator molecules." Claim 1741 recites "wherein said non-radioactively modified or labeled nucleotides or nucleotide

analogs are labeled with different indicator molecules." According to claim 1742, "said primers or said nucleoside triphosphates or analogs thereof are labeled."

Claims 1743-1748 are directed to embodiments of the "nucleotide analog" recited in various independent claims. Set forth below are the listing of new claims, a description of the subject matter claimed, and citation to the portions of the specification supporting the claimed subject matter.

New Claim No.	Subject Matter Claimed	Support in Specification
1743	said base analogs are selected from the group consisting of analogs of pyrimidine, purine and 7-deazapurine	Page 91 ("Two minor purines") Page 91 ("Two minor pyrimidines") Page 72, Example XXV (Toyocamycin and tubericidin are base analogs)
1744	said purine analogs are selected from the group consisting of thymidine analogs, uridine analogs, deoxyuridine analogs, cytidine analogs and deoxycytidine analogs	Page 91 ("Two minor purines") Page 31, line 14 ("thymidine analog") Page 62, Ex. XIII, Page 63 Exs. XIV and XV; Page 64, Exs. XVI and XVII; Page 72, Ex. XXIV; Page 75, Ex. XXII; Page 76, Ex. XXXII; Page 78, Ex. XXXV; Page 79, Ex. XXXVII; and Page 80, Ex. XXXVIII ("deoxyuridine analogs")
1745	said uridine analogs comprise 5-bromo-2'-deoxyuridine-5'-phosphate	Page 78, Ex. XXXV ("5-bromo-2'-deoxyuridine-5-phosphate")
1746	said deoxycytidine analogs comprise 5-hydroxymethyl-2'-deoxycytidylic acid	Page 60, Ex. X ("5-hydroxymethyl-2'-deoxycytidylic acid")

New Claim No.	Subject Matter Claimed	Support in Specification
1747	said purine analogs are selected from the group consisting of adenosine analogs, deoxyadenosine analogs, guanosine analogs and deoxyguanosine analogs	Page 72, Ex. XXV ("toyocamycin" and "tubericidin") Page 54, last ¶ ("alkylating agents . . . N2 group of guanine, the N4 group of adenosine or the N4 group of cytosine are alkylated")
1748	said adenosine analogs are selected from the group consisting of tubericidin and toyocamycin	Page 72, Ex. XXV ("toyocamycin" and "tubericidin")

Entry of the above amendments and new claims 1739-1748 is respectfully requested.

III. The Rejection Under 35 U.S.C. §112, Second Paragraph

Claim 1593 stands rejected for indefiniteness under 35 U.S.C. §112, second paragraph. In the Office Action (page 2), the Examiner stated that "[i]n claim 1593 there is a lack of antecedent basis for the phrase 'said living organism.' Also, claim 1593 depends from claim 1592 which is limited to human practice whereas claim 1593 confusingly is broader."

As indicated, claim 1593 and claims 723, 876, 1027, 1179, 1304 and 1417 have been amended in response to the indefiniteness rejection of claim 1593 which no longer recites the word "living" as it applies to "organism." As amended above, claim 1593 depends from claims 1583 or 1584. Claim 1583 recites "organism"

and claim 1584 recites "said organism is living." Proper antecedent basis is now provided in claim 1593.

In view of the above amendments to the claims, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. §112, second paragraph.

IV. The First Rejection Under 35 U.S.C. §102(b)

Claims 1298-1304, 1306, 1320, 1323-1333, 1338-1340, 1345-1355, 1358, 1373, 1383, 1388-1392, 1394, 1396, 1398-1400, 1403, 1406, 1407, 1582, 1583, 1585, 1596-1599, 1601, 1602, 1604-1619, 1621-1637, 1639, 1641, 1644-1651, 1653, 1656, 1682, 1686-1688, 1692, 1694, 1695 and 1697-1699 stand rejected under 35 U.S.C. §102(b) for anticipation by Langer et al. ["Enzymatic synthesis of biotin-labeled polynucleotides: Novel nucleic acid affinity probes," Proc. Natl. Acad. Sci. (USA) 78(11):6633-6637 (November 1981)]. In the Office Action (page 3), the Examiner stated that "[o]n page 6636 in Figure 3 with the associated discussion the detection of biotin base labeled DNA via hybridization is disclosed which anticipates the above listed instant claims."

The anticipation rejection is respectfully traversed because there is at least one material element in the present invention that is lacking in Langer's disclosure.

Applicants respectfully point out that Langer et al. disclose analogs of dUTP and UTP that contain a biotin molecule covalently attached to the C-5 position of the pyrimidine ring through an allylamine linker arm. As set forth in Figure 3 on page 6636, Langer et al. disclose using such analogs to nick translate sheared *E. coli* DNA to make biotin-labeled DNA which is then hybridized to a 220-fold excess of denatured nonradiolabeled *E. coli* DNA. That disclosure does not, however,

anticipate Applicants' claimed detection processes which are directed to the use of detectable non-radioactive modified or labeled nucleotides or nucleotide analogs, which in the case of pyrimidine bases, are not modified at the C-5 position. In fact, Applicants' detection processes specifically eschew the C-5 position disclosed by Langer et al. In the case of claim 1298, for example, the first Markush member (i) is defined as having the detectable non-radioactive moiety Sig "covalently attached to BASE directly or through a linkage group at a position other than the C5 position when BASE is a pyrimidine moiety or an analog thereof, . . ." The other independent claims for detection processes which have been rejected for anticipation by Langer et al. also contain similar language eschewing the C-5 position.

In view of the lack of material identity between the cited Langer disclosure and the presently claimed detection processes, Applicants respectfully request reconsideration and withdrawal of the first anticipation rejection.

V. The Second Rejection Under 35 U.S.C. §102(b)

Claims 1298-1304, 1306, 1320, 1324-1333, 1338-1340, 1345, 1348, 1349, 1358, 1359, 1373, 1388-1392, 1394, 1398-1400, 1403, 1406, 1582, 1583, 1585, 1596-1599, 1601, 1602, 1604-1619, 1621-1624, 1628, 1631, 1632, 1639, 1644, 1686-1688, 1694-1697 and 1699 stand rejected under 35 U.S.C. §102(b) for anticipation by Dale et al. ["Mercurated Polynucleotides: New Probes for Hybridization and Selective Polymer Fractionation," Biochemistry 14(11):2458-2469 (1975)]. In the Office Action (page 3), the Examiner stated that "[o]n page 2459 in Figure 1 with the associated discussion the detection of

mercurated base labeled DNA via hybridization is disclosed which anticipates the above listed instant claims."

The second anticipation rejection is respectfully traversed because the present invention calls for at least one material element lacking in Dale's disclosure.

Applicants respectfully point out that, as in the case of Langer et al. (1981) cited in the first anticipation rejection discussed *supra*, the cited Dale and Ward disclosure is also limited to the C-5 position of pyrimidine bases. More particularly, Dale and Ward mercurate polynucleotides by attaching mercurithioester side chains to the C-5 carbon of the pyrimidine bases. By so doing, Dale and Ward reported that no steric interactions occurred "between the individual mercurithiol substituents or between the substituents and the phosphodiester backbone" (page 2468, left column, last two lines, through right column, first two lines). See also Figure 6, especially Figures 6B and 6C on 2463.

In contrast to Dale and Ward, Applicants' claimed detection processes utilize detectable non-radioactive modified or labeled nucleotides or nucleotide analogs in which a detectable non-radioactive Sig moiety is "covalently attached to BASE directly or through a linkage group at a position other than the C5 position when BASE is a pyrimidine moiety or an analog thereof, . . ." Thus, there is a clear lack of material identity between Applicants' claimed detection processes and the cited Dale and Ward disclosure.

In light of the foregoing remarks, Applicants respectfully request reconsideration and withdrawal of the second rejection under §102(b).

VI. Previous Submission of Art-Related Documents

Applicants acknowledge that several Japanese language citations from their Fourth and Fifth Supplemental Information Disclosure Statements filed on September 19, 2001 and September 20, 2001, respectively, were not considered by the Examiner. As noted in those IDS filings, the existence of these Japanese documents came to Applicants' attention through an issued U.S. patent. In an effort to obtain English translations or English language equivalents for these documents, Applicants and their attorney reviewed the PTO's file wrapper which did not contain any such translations or equivalents.

Favorable action is respectfully sought.

* * * * * * *

SUMMARY AND CONCLUSIONS

Claims 569-595, 597-643, 645-646, 648-651, 654-679, 681-682, 684-687, 690-714, 716-717, 719-747, 749-797, 800-803, 805-831, 833-834, 836-839, 842-866, 868-869, 871-899, 901-947, 949-950, 952-955, 958-983, 985-986, 988-991, 994-1018, 1020-1021, 1023-1051, 1053-1099, 1101-1102, 1104-1107, 1110-1135, 1137-1138, 1140-1143, 1146-1173, 1175-1250, 1252-1253, 1255-1258, 1260-1294, 1296-1407, 1409-1568, 1570-1612 and 1614-1748 are being presented for further prosecution on the merits.

No extension fee or claim fee is believed due in connection with this filing, the Amendment being timely filed and a greater number of claims having been paid for over the number of claims now being presented above. In the event that any fee or fees are due, however, The Patent and Trademark Office is hereby authorized to charge the amount of any such fee(s) to Deposit Account No. 05-1135, or to credit any overpayment thereto.

If a telephone conversation would further the prosecution of the present application, Applicants' undersigned attorney request that he be contacted at the number provided below.

Respectfully submitted,

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Enz-5(D8)(C2)

583. (Three Times Amended) The process according to claim 569, wherein in said providing or generating step the fragments are provided or generated [~~is carried out by means of~~] by one or more primers, [~~or~~] nucleoside triphosphates or analogs thereof, or a combination thereof.

642. (Amended) The process according to claim 600, wherein Sig comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, [~~an enzyme,~~] a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

648. (Amended) The process according to claim 600, wherein Sig comprises a sugar residue and the sugar residue is [~~complexed~~] capable of complexing with [~~or attached to~~] a sugar binding protein or a polysaccharide binding protein.

670. (Amended) The process according to claim 657, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, a chelating component, and a combination of any of the foregoing.

678. (Amended) The process according to claim 601, wherein A comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, [~~an enzyme,~~] a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

684. (Amended) The process according to claim 601, wherein A comprises a sugar residue and the sugar residue is [~~complexed~~] capable of complexing with [~~or attached to~~] a sugar binding protein or a polysaccharide binding protein.

706. (Amended) The process according to claim 693, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, a chelating component, and a combination of any of the foregoing.

711. (Amended) The process according to claim 710, wherein said one or more indicator molecules comprise [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs.

712. (Amended) The process according to claim 711, wherein said [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs comprise [~~fluoresceinated~~] fluorescent DNA.

723. (Amended) The process according to [~~claim~~] claims 722 or 726, wherein said organism is selected from the group consisting of bacteria, fungi, viruses, yeast, mammals, and a combination of any of the foregoing.

735. (Amended) The process according to claim 721, wherein in said providing or generating step the fragments are provided or generated [~~is carried out by means of~~] by one or more primers, [~~or~~] nucleoside triphosphates or analogs thereof, or a combination thereof.

794. (Amended) The process according to claim 752, wherein Sig comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, [~~an enzyme,~~] a hormone component, a metal containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

800. (Amended) The process according to claim 752, wherein Sig comprises a sugar residue and the sugar residue is [~~complexed~~] capable of complexing with [~~or attached to~~] a sugar binding protein or a polysaccharide binding protein.

822. (Amended) The process according to claim 809, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, a chelating component, and a combination of any of the foregoing.

830. (Amended) The process according to claim 753, wherein A comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, [~~an enzyme,~~] a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

836. (Amended) The process according to claim 753, wherein A comprises a sugar residue and the sugar residue is [~~complexed~~] capable of complexing with [~~or attached to~~] a sugar binding protein or a polysaccharide binding protein.

858. (Amended) The process according to claim 845, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, a chelating component, and a combination of any of the foregoing.

863. (Amended) The process according to claim 862, wherein said one or more indicator molecules comprise [~~fluoresceinated~~] fluoresecent nucleotides or nucleotide analogs.

864. (Amended) The process according to claim 863, wherein said [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs comprise [~~fluoresceinated~~] fluorescent DNA.

876. (Amended) The process according to [~~claim~~] claims 875 or 878, wherein said organism comprises a mammal.

887. (Amended) The process according to claim 873, wherein in said providing or generating step the fragments are provided or generated [~~is carried out~~] by one or more primers, [~~or~~] nucleoside triphosphates or analogs thereof, or a combination thereof.

946. (Amended) The process according to claim 904, wherein Sig comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, [~~an enzyme,~~] a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

952. (Amended) The process according to claim 904, wherein Sig comprises a sugar residue and the sugar residue is [~~complexed~~] capable of complexing with [~~or attached to~~] a sugar binding protein or a polysaccharide binding protein.

974. (Amended) The process according to claim 961, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, a chelating component, and a combination of any of the foregoing.

982. (Amended) The process according to claim 905, wherein A comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, [~~an enzyme,~~] a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

988. (Amended) The process according to claim 905, wherein A comprises a sugar residue and the sugar residue is [~~complexed~~] capable of complexing with [~~or attached to~~] a sugar binding protein or a polysaccharide binding protein.

1010. (Amended) The process according to claim 1009, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, a chelating component, and a combination of any of the foregoing.

1015. (Amended) The process according to claim 1014, wherein said one or more indicator molecules comprise [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs.

1016. (Amended) The process according to claim 1015, wherein said [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs comprise [~~fluoresceinated~~] fluorescent DNA.

1027. (Amended) The process according to [~~claim~~] claims 1026 or 1030, wherein said organism is selected from the group consisting of bacteria, fungi, viruses, yeast, mammals, and a combination of any of the foregoing.

1039. (Amended) The process according to claim 1025, wherein prior to said [~~providing or generating~~] detecting step [~~is carried out by means of~~] the fragments are provided or generated by one or more primers, [~~or~~] nucleoside triphosphates or analogs thereof, or a combination thereof.

1043. (Twice Amended) The process according to claim 1025, wherein prior to said detecting [~~providing or generating~~] step, the one or more non-radioactive modified or labeled nucleotides or nucleotide analogs have been incorporated into said nucleic acid fragment or fragments.

1056. (Twice Amended) The process according to claim 1025, wherein in said [~~providing or generating~~] detecting step, the non-radioactive modified or labeled nucleotides or nucleotide analogs comprise one or more members selected from the group consisting of:

(i) a nucleotide or nucleotide analog having the formula

PM—SM—BASE—Sig

wherein

PM is a phosphate moiety or phosphate analog,

SM is a sugar moiety or sugar analog,

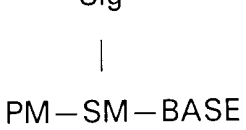
BASE is a pyrimidine, a purine or a 7-deazapurine base moiety

or a base analog of any of the foregoing; and

Sig is a detectable non-radioactive moiety,

wherein PM is covalently attached to SM, BASE is covalently attached to SM, and Sig is covalently attached to BASE directly or through a linkage group at a position other than the C5 position when BASE is a pyrimidine moiety or an analog thereof, at a position other than the C8 position when BASE is a purine moiety or an analog thereof and at a position other than the C7 position when BASE is a 7-deazapurine moiety or an analog thereof;

(ii) a nucleotide or nucleotide analog having the formula



wherein

PM is a phosphate moiety or phosphate analog,

SM is a sugar moiety or sugar analog,

BASE is a base moiety or base analog, and

Sig is a detectable non-radioactive moiety,

wherein PM is covalently attached to SM, BASE is covalently attached to SM, and Sig is covalently attached to SM directly or through a linkage group; and

(iii) a nucleotide or nucleotide analog, said nucleotide having the formula

Sig—PM—SM—BASE

wherein

PM is a phosphate moiety or phosphate analog,

SM is a sugar moiety or sugar analog,

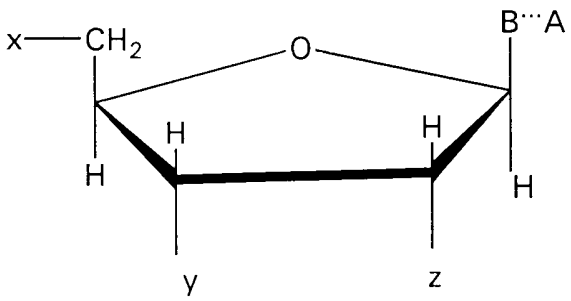
BASE is a base moiety or base analog, and

Sig is a detectable non-radioactive moiety,

wherein PM is covalently attached to SM, BASE is covalently attached to SM, and Sig is covalently attached to PM directly or through a linkage group.

1057. (Twice Amended) The process according to claim 1025, wherein prior to said [~~providing or generating~~] detecting step, the non-radioactive modified or labeled nucleotides or nucleotide analogs have the structure:

(i)



wherein B represents a purine moiety, a 7-deazapurine moiety, a pyrimidine moiety, or an analog of any of the foregoing, and B is covalently bonded to the C1'-position of the sugar moiety or sugar analog, provided that whenever B is a

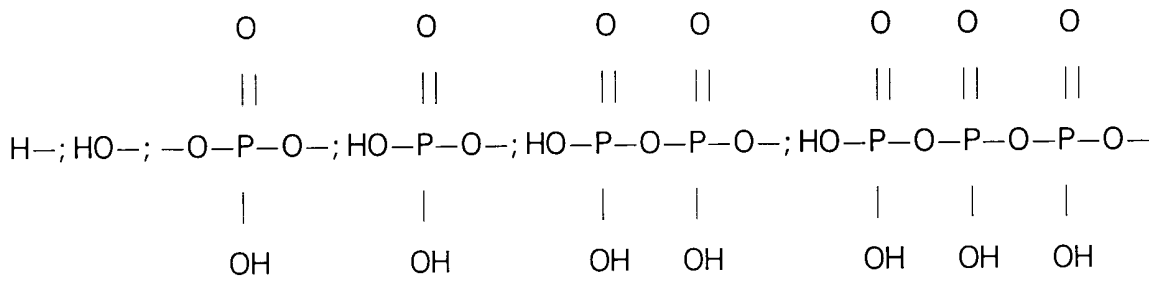
purine, a purine analog, a 7-deazapurine moiety or a 7-deazapurine analog, the sugar moiety or sugar analog is attached at the N9 position of the purine moiety, the purine analog, the 7-deazapurine moiety or the 7-deazapurine analog thereof, and whenever B is a pyrimidine moiety or a pyrimidine analog, the sugar moiety or sugar analog is attached at the N1 position of the pyrimidine moiety or the pyrimidine analog;

wherein A comprises at least three carbon atoms and represents at least one component of a signalling moiety capable of producing directly or indirectly a detectable non-radioactive signal; and

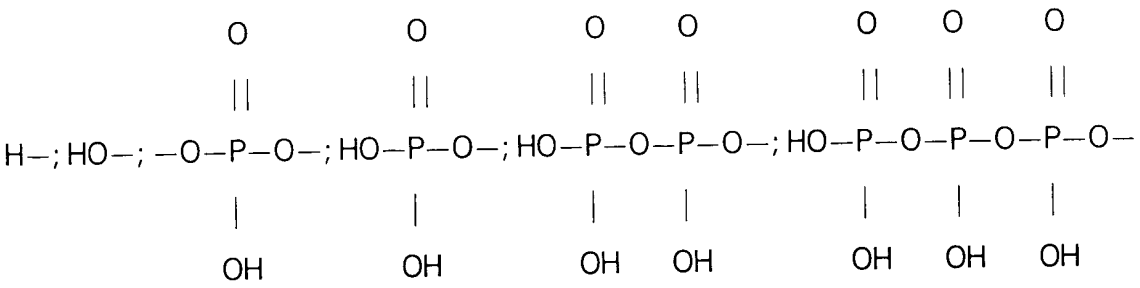
wherein B and A are covalently attached directly or through a linkage group,

wherein if B is a purine or a purine analog, A is attached to the 8-position of the purine or purine analog, if B is a 7-deazapurine or 7-deazapurine analog, A is attached to the 7-position of the deazapurine or deazapurine analog, and if B is a pyrimidine or a pyrimidine analog, A is attached to the 5-position of the pyrimidine or pyrimidine analog; and

wherein x comprises a member selected from the group consisting of:



wherein y comprises a member selected from the group consisting of:



wherein z comprises a member selected from the group consisting of H– and HO–.

1098. (Amended) The process according to claim 1056, wherein Sig comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, [~~an enzyme,~~] a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

1104. (Amended) The process according to claim 1056, wherein Sig comprises a sugar residue and the sugar residue is [~~complexed~~] capable of complexing with [~~or attached to~~] a sugar binding protein or a polysaccharide binding protein.

1126. (Amended) The process according to claim 1113, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, a chelating component, and a combination of any of the foregoing.

1134. (Amended) The process according to claim 1057, wherein A comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, [~~an enzyme,~~] a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

1140. (Amended) The process according to claim 1057, wherein A comprises a sugar residue and the sugar residue is [~~complexed~~] capable of complexing with [~~or attached to~~] a sugar binding protein or a polysaccharide binding protein.

1162. (NEW) The process according to claim 1149, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, a chelating component, and a combination of any of the foregoing.

1163. (Twice Amended) The process according to claim 1025, wherein said [~~detectable~~] detectable labeled nucleic acid fragments are detectable by a non-radioactive means selected from the group consisting of a fluorescent measurement, a chemiluminescent measurement, and a combination thereof.
[Note: The word "detectable" was inadvertently underlined in Exhibit 1 of Applicants' July 13, 2001 Consolidation Amendment. The inadvertent underlining is being deleted in the amendment above.]

1167. (Amended) The process according to claim 1166, wherein said one or more indicator molecules comprise [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs.

1168. (Amended) The process according to claim 1167, wherein said [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs comprise [~~fluoresceinated~~] fluorescent DNA.

1179. (Amended) The process according to [~~claim~~] claims 1178 or 1182, wherein said organism is selected from the group consisting of bacteria, fungi, viruses, yeast, mammals, and a combination of any of the foregoing.

1249. (Amended) The process according to claim 1177, wherein said A or Sig comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, [~~an enzyme,~~] a hormone component, a metal-containing component, a chromogenic component, a fluorescent component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

1255. (Amended) The process according to claim 1177, wherein said A or Sig comprises a sugar residue and the sugar residue is [~~complexed~~] capable of complexing with [~~or attached to~~] a sugar binding protein or a polysaccharide binding protein.

1270. (Amended) The process according to claim 1264, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, and a chelating component, and a combination of any of the foregoing.

1288. (Amended) The process according to claim 1287, wherein said one or more indicator molecules comprise [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs.

1289. (Amended) The process according to claim 1288, wherein said [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs comprise [~~fluoresceinated~~] fluorescent DNA.

1304. (Amended) The process according to [~~claim~~] claims 1302 or 1305, wherein said organism is selected from the group consisting of bacteria, fungi, viruses, yeast, mammals, and a combination of any of the foregoing.

1358. (Amended) The process according to claim 1298, wherein Sig comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, an enzyme, a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

1386. (Amended) The process according to claim 1373, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, and a chelating component, and a combination of any of the foregoing.

1398. (Amended) The process according to claim 1394, wherein the moiety which can be detected when the complex is formed is selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, an enzyme, a hormone component, a metal-containing component, a fluorescent component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

1401. (Amended) The process according to claim 1400, wherein said one or more indicator molecules comprise [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs.

1402. (Amended) The process according to claim 1401, wherein said [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs comprise [~~fluoresceinated~~] fluorescent DNA.

1417. (Amended) The process according to [~~claim~~] claims 1415 or 1418, wherein said organism is selected from the group consisting of bacteria, fungi, viruses, yeast, mammals, and a combination of any of the foregoing.

1430. (Twice Amended) The process according to claim 1411, wherein said [~~oligo- or polynucleotide (i) comprises at least one~~] non-radioactive detectable protein [~~binding nucleic acid sequence~~] is selected from the group consisting of an antibody, a promoter, a repressor and an inducer.

1454. (Amended) The process according to claim 1445, wherein said signaling component or indicator molecule comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, an enzyme, a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

1516. (Amended) The process according to any of claims 1473, 1474, 1475 or 1476, wherein Sig comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, an enzyme, a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

1545. (Amended) The process according to claim 1544, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, and a chelating component, and a combination of any of the foregoing.

1559. (Amended) The process according to claim 1553, wherein the moiety which can be detected when the complex is formed is selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, an enzyme, a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

1562. (Amended) The process according to claim 1561, wherein said one or more indicator molecules comprise [~~fluoresceinated~~] fluorescent nucleotides.

1563. (Amended) The process according to claim 1562, wherein said [~~fluoresceinated~~] fluorescent nucleotides or nucleotide analogs comprise [~~fluoresceinated~~] fluorescent DNA.

1593. (Amended) The process according to [~~claim 1592~~] claims 1583 or 1584, wherein said [~~living~~] organism is selected from the group consisting of bacteria, fungi, viruses, yeast, mammals, and a combination of any of the foregoing.

1599. (Amended) The process according to claim 1582, wherein said [~~nuceotide~~] nucleotide analog can be attached terminally to DNA or RNA by means of an enzyme.

1656. (Amended) The process according to claim 1582, wherein said Sig comprises a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, an enzyme, a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

1677. (Amended) The process according to claim 1671, wherein said indicator molecule comprises a member selected from the group consisting of a fluorescent component, a chromogenic component, a chemiluminescent component, and a chelating component, and a combination of any of the foregoing.

1716. (Amended) The process according to claim 1712, wherein said one or more detectable oligonucleotides or polynucleotides comprise a member selected from the group consisting of biotin, iminobiotin, an electron dense component, a magnetic component, an enzyme, a hormone component, a metal-containing component, a fluorescent component, a chromogenic component, a chemiluminescent component, an antigen, a hapten, an antibody component and a chelating component.

1718. (Twice Amended) The process according to claim 1712, wherein said detecting step is carried out by means of a member selected from the group consisting of enzymatic measurement, a fluorescent measurement, a [~~phosphorescent~~] chromogenic measurement, a chemiluminescent measurement, a microscopic measurement and an electron density measurement.

1728. (Amended) The process of any of claims 1700, 1701, 1702, 1704, 1706, 1708, 1709, 1710 or 1711, wherein in said providing step, the chelating compounds or chelating components provide a detectable signal [~~generated by or selected from the group consisting of~~] that is radioactive [~~means~~], chromogenic [~~means~~], fluorogenic [~~means~~], fluorescent [~~means~~], chemiluminescent, electron dense [~~means and~~] or magnetic [~~means~~].

1729. (Amended) The process of claim 1703, wherein said detecting step, the chelating compounds or chelating components provide a detectable signal [~~generated by or selected from the group consisting of~~] that is radioactive [~~means~~], chromogenic [~~means~~], fluorogenic [~~means~~], fluorescent [~~means~~], chemiluminescent, electron dense [~~means and~~] or magnetic [~~means~~].

1730 (Amended) The process of claim 1705, wherein said specific hybridizing step, the chelating compounds or chelating components provide a detectable signal [~~generated by or selected from the group consisting of~~] that is radioactive [~~means~~], chromogenic [~~means~~], fluorogenic [~~means~~], fluorescent [~~means~~], chemiluminescent, electron dense [~~means and~~] or magnetic [~~means~~].

1731. (Amended) The process of claim 1707, wherein said contacting step, the chelating compounds or chelating components provide a detectable signal [~~generated by or selected from the group consisting of~~] that is radioactive [~~means~~], chromogenic [~~means~~], fluorogenic [~~means~~], fluorescent [~~means~~], chemiluminescent, electron dense [~~means and~~] or magnetic [~~means~~].

1732. (Amended) The process of any of claims 1700, 1701, 1702, 1703, 1704, 1705, 1706, 1707, 1708, 1709, 1710 or 1711, wherein said detecting step is carried out by a [~~means selected from the group consisting of~~] compound or component that is radioactive [~~means~~], chromogenic [~~means~~], fluorogenic [~~means~~], fluorescent [~~means~~], chemiluminescent, electron dense [~~means and~~] or magnetic [~~means~~].

* * * * * * *